CL-1576

ATCC

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BUDAPEST TREATY ON THE INTERNATIONAL RECOGNITION OF
THE DEPOSIT OF MICROORGANISMS FOR THE PURPOSES OF PATENT PROCEDURE

INTERNATIONAL FORM

RECEIPT IN THE CASE OF AN ORIGINAL DEPOSIT ISSUED PURSUANT TO RULE 7.3
AND VIABILITY STATEMENT ISSUED PURSUANT TO RULE 10.2

To: (Name and Address of Depositor or Attorney)

DuPont Company
Attn: Kyungok Wun-Kim
DuPont Experimental Station
E301/317
Willmington, DE 19880

Deposited on Behalf of: DuPont Company

Identification Reference by Depositor:
Methylomonas: *Methylomonas* 16a sp.

Patent Deposit Designation
PTA-2402

The deposit was accompanied by: __ a scientific description a proposed taxonomic description indicated above.

The deposit was received August 22, 2000 by this International Depository Authority and has been accepted.

AT YOUR REQUEST: X We will inform you of requests for the strain for 30 years.

The strain will be made available if a patent office signatory to the Budapest Treaty certifies one's right to receive, or if a U.S. Patent is issued citing the strain, and ATCC is instructed by the United States Patent & Trademark Office or the depositor to release said strain.

If the culture should die or be destroyed during the effective term of the deposit, it shall be your responsibility to replace it with living culture of the same.

The strain will be maintained for a period of at least 30 years from date of deposit, or five years after the most recent request for a sample, whichever is longer. The United States and many other countries are signatory to the Budapest Treaty.

The viability of the culture cited above was tested September 8, 2000. On that date, the culture was viable.

International Depository Authority: American Type Culture Collection, Manassas, VA 20110-2209 USA.

Signature of person having authority to represent ATCC:

Date: November 16, 2000

Frank Simi ne, Director, Patent Depository

cc: S. Neil Feltham (Ref: Docket r Case N .: BC-1039)

BP4/9

The invention can be more fully understood from the following detailed description and the accompanying sequence descriptions which form a part of this application.

The following sequences conform with 37 C.F.R. 1.821-1.825 ("Requirements for Patent Applications Containing Nucleotide Sequences and/or Amino Acid Sequence Disclosures - the Sequence Rules") and consistent with World Intellectual Property Organization (WIPO) Standard ST.25 (1998) and the sequence listing requirements of the EPO and PCT (Rules 5.2 and 49.5(a-bis), and Section 208 and Annex C of the Administrative Instructions). The symbols and format used for nucleotide and amino acid sequence data comply with the rules set forth in 37 C.F.R. §1.822.

SEQ ID NOs:1-38 are full length genes or proteins as identified in Table 1.

Table 1

Summary of Gene and Protein SEQ ID Numbers

Description	SEQ ID Nucleic acid	SEQ ID Peptide
Phosphofructokinase pyrophosphate dependent	1	2
KHG/KDPG Aldolase	3	4
dxs	5	6
dxr	7	8
ispD (ygbP	9	10
ispE(ychB)	11	12
ispF (ygbB)	13	14
pyrG	15	16
lytB	17	18
ispA	19	20
CrtN1	21	22
CrtN2	23	24
crtE	25	26
crtX	27	28
crtY	29	30
crtI	31	32
crtB	33	34
crtZ	35	36
crtO	37	38

SEQ ID Nos:39-40 are amplification primers for the HMPS promoter

SEQ ID Nos:41-42 are amplification primers for the crtO gene from *Rhodococcus*.

The term "carbon conversion efficiency" is a measure of how much carbon is assimilated into cell mass and is calculated assuming a biomass composition of $CH_2O_{0.5}N_{0.25}$.

The term "C_1 carbon substrate" refers to any carbon-containing molecule that lacks a carbon-carbon bond. Examples are methane, methanol, formaldehyde, formic acid, formate, methylated amines (e.g., mono-, di-, and tri-methyl amine), methylated thiols, and carbon dioxide.

The term "C1 metabolizer" refers to a microorganism that has the ability to use an single carbon substrate as a sole source of energy and biomass. C1 metabolizers will typically be methylotrophs and/or methanotrophs.

The term "methylotroph" means an organism capable of oxidizing organic compounds which do not contain carbon-carbon bonds. Where the methylotroph is able to oxidize CH4, the methylotroph is also a methanotroph.

The term "methanotroph" means a prokaryote capable of utilizing methane as a substrate. Complete oxidation of methane to carbon dioxide occurs by aerobic degradation pathways. Typical examples of methanotrophs useful in the present invention include but are not limited to the genera *Methylomonas, Methylobacter, Methylococcus,* and *Methylosinus*.

The term "high growth methanotrophic bacterial strain" refers to a bacterium capable of growth with methane or methanol as sole carbon and energy source which possess a functional Embden-Meyerhof carbon flux pathway resulting in a yield of cell mass per gram of C1 substrate metabolized. The specific "high growth methanotrophic bacterial strain" described herein is referred to as "*Methylomonas* 16a" or "16a", which terms are used interchangeably.

The term "*Methylomonas 16a*" and "*Methylomonas 16a sp.*" Are used interchangeably and refer to the *Methylomonas* strain used in the present invention.

The term "isoprenoid compound" refers to any compound which is derived via the pathway beginning with isopentenyl pyrophosphate (IPP) and formed by the head-to-tail condensation of isoprene units which may be of 5, 10, 15, 20, 30 or 40 carbons in length. There term "isoprenoid pigment" refers to a class of isoprenoid compounds which typically have strong light absorbing properties.